Sacred Heart UNIVERSITY
DEPARTMENT OF BIOLOGY

February 20, 2022

To: Commissioner Dykes, CT-DEEP

From: Jennifer H. Mattei, Ph.D. Professor, Department of Biology, IUCN Species Survival Commission Horseshoe Crab Specialist Group, Steering Committee Member

Regarding: Response to call from CTDEEP on public hearing regarding H.B. 5140 AN ACT CONCERNING THE HAND-HARVESTING OF HORSESHOE CRABS IN THE STATE

Horseshoe Crab harvest regulations.

Executive Summary of 20 years of research on the Population Ecology of the American Horseshoe Crab population inhabiting Long Island Sound.

I have been conducting research on the population ecology of *Limulus polyphemus*, the American horseshoe crab, for over 20 years. In short, due to multiple stressors, the population is in decline and due to very low population numbers the horseshoe crab is functionally extinct in Long Island Sound.

I first brought this to the attention of CTDEEP in 2005 when it was decided that three areas would be off limits to harvest. Our research has established long-term census records of hundreds of spawning horseshoe crabs at two of the protected sites, i.e. Sandy Point in West Haven and Milford Point in Milford. The third no harvest area, Menunketesuck Island, has not been surveyed. Since it takes 10 to 12 years for juvenile horseshoe crabs to develop into adults, it would be difficult to assess if this conservation effort had any measurable effect on the population until now. Since 2006, we have continued to monitor the spawning horseshoe crabsin these 2 areas and across beaches in Connecticut with our well-known citizen science program, Project *Limulus*. We have found that these two no harvest zones have not resulted in an increase in the spawning horseshoe crab population. In fact, we have documented the continued decline of this species (see Fig. 1).

Even though only ~12 permits exist to harvest horseshoe crabs and the reported catch is low, thousands of additional crabs are harvested every spawning season (Mattei, personal observation and observations reported by citizen scientists of Project *Limulus*). The hand harvest of the breeding population is a major cause of population decline in the Sound. Other stressors include loss of habitat (both marsh and sandy areas), pollution, bycatch in ghost nets and abandoned lobster traps as well as entrapment in intake pipes of powerplants (Smith et al 2017, Mattei, pers. obs.).

In 2015, we recommended changing the harvest regulations to a male only harvest which is the practice in Delaware (Beekey and Mattei, 2015). Now, we highly recommend closing all harvest of this species in Connecticut and New York (Mattei et al. in press). Our tag data has shown that across the beaches in Connecticut, the number of mated pairs found is declining and the number of single females found on the beach without a mate is increasing. The density of spawning horseshoe crabs is so low that the females cannot find mates and therefore this population is not reproducing at its maximum potential. The horseshoe crabs in Long Island Sound are not endangered of extirpation, at least currently, but their ecological role has been severely diminished. Horseshoe crabs function as a dominant species (not a keystone species) and their abundance is what is of ecological importance. They are no longer a source of food for shorebirds and fish

in LIS. No eggs are washed into the surf. Yes, you do see thousands of horseshoe crabs in some areas of Connecticut but their population density does not allow them to function within the food web as they have in the past. This "functional extinction" has occurred with other species in CT as well including pollinating insects, oysters, Spartina grasses, etc. **A management plan that merely keeps a species from going extinct is not good enough. It should keep the Long Island Sound ecosystem functioning sustainably.**

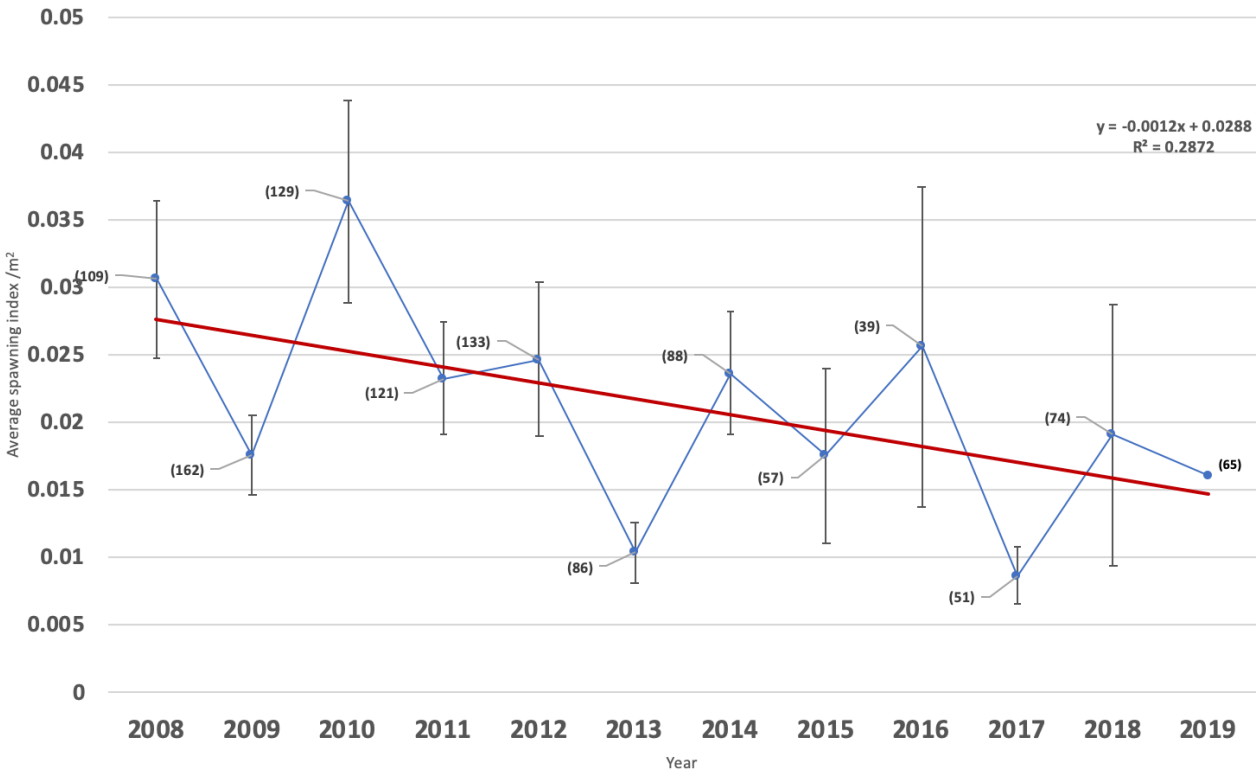

Figure 1. Average nighttime spawning index/m^2 ±SE for all surveyed beaches from 2008-2018. Parentheses indicate the number of surveys included in the average. Y = -0.0013x + 0.0291, R^2 = 0.2609, p >0.05 (Mattei et al. in press).

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